
Corpus Christi Constraints Threaten Crude Exports

Significant dock buildout won't relieve vessel delays.

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Data Sources for This Publication

Railroad Commission of Texas
Port of Corpus Christi
U.S. Census

To discover more about the data sources used, [click here](#).

Major Congestion

Incoming pipelines today bring approximately 1.1 million barrels/day of crude and condensate into the Corpus Christi, Texas, region. New pipelines coming on line in the next few months will increase inbound capacity by 2.5 mmb/d with the majority coming from the Permian Basin in West Texas. Most of the new supplies will head to marine docks for export. Corpus Christi docks today have nominal capacity to handle over 2 mmb/d of shipments, and onshore and offshore facilities being built out by 2023 could add another 4 mmb/d. In practice, though, vessel size and channel restrictions in the Corpus Christi harbor will constrain increased traffic without port infrastructure investment that won't be complete until 2022. The result could be major congestion at Corpus Christi docks in the next two years. This note reviews current and future Corpus Christi marine dock plans.

Growing Deliveries

Most crude delivered by pipeline to Corpus Christi today originates from the South Texas Eagle Ford Shale. Only the Plains All American/Enterprise Products Partners joint venture Eagle Ford pipeline between Gardendale in La Salle County, Texas, and Corpus Christi delivers crude from the West Texas Permian Basin via a connection to the Plains Cactus pipeline. Exhibit 1 (top part of table) shows existing pipelines that have 1.7 mmb/d capacity to ship a mixture of light sweet shale crude and ultralight condensate into Corpus Christi. Based on Railroad Commission of Texas data, we estimate January 2019 flows into Corpus Christi on these pipelines at 1.1 mmb/d, indicating 0.6 mmb/d unused capacity. Port of Corpus Christi commodity shipment data and U.S. Census export data show that between January and June, an average 0.5 mmb/d of crude was exported and a further 0.2 mmb/d shipped to domestic destinations by barge or tanker. That implies local refineries and condensate splitters process a balance of 0.4 mmb/d out of the incoming 1.1 mmb/d.

Although there is available capacity on pipelines into Corpus Christi from the Eagle Ford, booming crude production in the Permian since the end of 2016 led to a host of proposed new pipelines to deliver that crude to the Texas Gulf Coast for export. Three of those proposals, now being completed, have capacity to deliver up to 2.5mmb/d of Permian and to a lesser degree Eagle Ford crude to Corpus Christi by mid-2020. These are the 670 mb/d Plains Cactus II, 900 mb/d private equity and producer financed Eagle Ford, Permian, Ingleside, and Corpus (EPIC), and the 900 mb/d Phillips 66/Andeavor joint venture Gray Oak pipelines (Exhibit 1, lower part of table). As of early August, Plains expected to begin deliveries on Cactus II this week; the other two are expected in partial service during the final quarter of 2019.

Exhibit 1 Current and Future Crude Pipeline Capacity into Corpus Christi

Pipeline	Owner	Basin	Origin	Destination	Capacity Mb/d	Estimated Corpus Volume Jan 2019 (mb/d)
Current						
Eagle Ford JV	Plains/Enterprise	Eagle Ford/Permian	Gardendale	Corpus/Houston	600	554
Double Eagle	Magellan/Kinder Morgan	Eagle Ford	Gardendale	Corpus/Houston	100	68
Various	Nustar	Eagle Ford	Various	Corpus Christi	420	199
Harvest	Hilcorp	Eagle Ford	Gardendale	Corpus Christi	250	57
Pettus South	Koch Industries	Eagle Ford	Pettus	Corpus Christi	250	199
Rio Bravo	Energy Transfer	Eagle Ford	McMullen	Corpus Christi	100	16
Total					1720	1092
Future						
Cactus II	Plains Ares Mgt, Texstar, CCI,	Permian	Midland	Corpus	670	
EPIC	Ironwood, Noble Midstream	Permian, Eagle Ford	Orla	Corpus	900	
Gray Oak	P66 (75%), Andeavor (25%)	Permian	Orla	Corpus/Freeport/Houston	900	
Total					2470	

Source: Company presentations, Railroad Commission of Texas, Morningstar Commodities.

Expansion

Assuming area refineries and condensate splitters are currently processing as much of the crude and condensate as they can, the majority of shipments on the new pipelines are destined for export. If they deliver anywhere near their design capacity of crude into Corpus Christi, the port's infrastructure needs to be expanded to accommodate additional exports. Two distinct types of expansion are required: first, the build-out of larger individual docks, and second, POCC-led investment to accommodate greater vessel and traffic volumes.

Dock Expansions

On paper, existing docks appear to offer capacity to load significant additional volumes onto vessels today. Exhibit 2 shows current and future dock capacity for crude and condensate outbound shipments. We estimate current nameplate throughput capacity at nearly 2.3 mmb/d based on company presentations. That's more than 3 times average outbound volumes this year of 0.7 mmb/d. Part of the reason for the apparent underuse of existing capacity is that port operations are constrained by vessel size and traffic restrictions, discussed in more detail below, that prevent additional vessels from using existing facilities without channel improvements.

Despite abundant throughput capacity, midstream companies continue to expand docks and plan new terminals to handle larger vessels and faster load rates (Exhibit 2, lower part of table). Some projects, like the Plains/Enterprise joint venture Eagle Ford terminal on the Corpus Christi ship channel, have been in the works for some time. Yet although that project (due on line this year) is capable of loading up to 960 mb/d, it can only handle smaller Aframax vessels (500-700 thousand-barrel loads). That makes it less attractive to exporters needing to fill the largest 2 million-barrel very large crude carriers, which are most economic for shipping crude to Asia. Instead, significant volumes from the new Plains Cactus II pipeline

will bypass the Eagle Ford terminal and head to NuStar's North Beach terminal outside the ship channel via a new pipeline link as well as to larger, more efficient docks at Ingleside in the outer harbor.

New Onshore

Two new onshore terminals, expected on line in 2020, are purpose-built to export crude from the new EPIC and Gray Oak pipelines. The South Texas terminal in the Corpus Christi ship channel is the primary destination of the EPIC pipeline. But although it will accommodate partially loaded 1 million-barrel Suezmax vessels, the terminal will only load 154 mb/d day, meaning that more of EPIC's crude is likely to be delivered direct to the Flint Hills Resources and Moda Midstream terminals at Ingleside in the outer harbor, which can load crude faster onto larger vessels. The Buckeye South Texas Gateway terminal at Ingleside will primarily handle crude from the Gray Oak pipeline, accommodating partially loaded VLCC tankers and able to load 800 mb/d.

VLCC Ready

Before 2023, three additional terminal projects will, if permitted and built, be able to load fully laden VLCC tankers. The first is Trafigura's proposed single-point mooring buoy Texas Gulf terminal located west of Corpus Christi, 14 miles out in the Gulf of Mexico, that we described in a September 2018 note ([Corpus Christi Objects to Trafigura Offshore Terminal](#)). The terminal will accommodate fully laden VLCCs and deliver crude direct to tankers via a lateral connection to incoming pipelines north of Corpus Christi. A second mooring buoy project is the Phillips 66 Bluewater Texas terminal linking Gray Oak crude to supertankers offshore northeast of Corpus Christi. These terminals are expected to take at least three years to permit and build, meaning that they probably won't be available to export crude until 2023. A third VLCC project is the Harbor Island terminal complex being developed in the outer harbor. That terminal is a joint venture of the POCC, Carlyle Group, and Berry Group and consists of two docks capable of berthing VLCC tankers fed by Ingleside pipelines. It will be the first onshore VLCC-capable dock on the Gulf Coast once a Carlyle-financed dredging operation deepens the channel depth to 75 feet. The Harbor Island project is already delayed up to 18 months by an unanticipated requirement for a full environmental impact survey by the U.S. Army Corps of Engineers that regulates channel dredging, so this project too is unlikely to be on line before 2023.

Exhibit 2 Current and Planned Corpus Christi Dock Capacity

Terminal	Owner	Storage (mmbbl)	Vessel Max	Load Rate mb/d
Current Operating				
North Beach Terminal	NuStar	3.3	Suezmax (light)	750
Ingleside	Flint Hills Resources	3.5	VLCC end 2019	220
Ingleside Texas Energy Center	Moda Midstream	12	VLCC light	700
Texas Hub Terminal	Buckeye/Trafigura	2.5	Aframax	350
Magellan Midstream (Ship Channel)	Magellan	3.0	Aframax	100
Viola Barge Dock	Plains	2.1	Aframax	120
Valero Refinery	Valero	N/A	Aframax	50
			Total	2290
New Projects				
Eagle Ford Terminal	Plains/Enterprise	1.4	Aframax	960
South Texas Gateway / Ingleside	Buckeye/MPLX/Phillips 66	7	VLCC light	800
South Texas Terminal	EPIC / CCI	N/A	Suezmax	154
Harbor Island	POCC /Carlyle	4	VLCC	1400
Offshore				
Texas Gulf Terminals	Trafigura	N/A	VLCC	500
Bluewater Texas Terminal	P66	N/A	VLCC	1920
			Total	4334

Source: Corporate Presentations, Morningstar Commodities.

Traffic Study

Together, these projects could add well over 4 mmb/d of crude dock load capacity in the Corpus area, easily enough to handle flows from the three new incoming pipelines — at least on paper. In practice, existing vessel size and channel width restrictions reduce the utility of new dock capacity. If these restrictions aren't addressed, vessel congestion will increase and the use of new facilities will be constrained, according to a recent report commissioned by the POCC.

The report by engineering firm Aecom, published in March, studied the future impact of large crude and liquefied natural gas vessels on Corpus Christi channel capacity, highlighting several constraints. The study noted rapid expansion of larger vessel use by crude shippers in the past two years as exports took off. That's because exporters prefer VLCCs to take advantage of the lowest long-haul freight rates to Asia. Now these vessels can't navigate the inner harbor at Corpus Christi because the channel isn't deep enough, and they can only travel the outer harbor partially loaded with a maximum 1.4 mmb. Exporters therefore typically use ship-to-ship transfers from smaller Aframax (500-700 thousand barrels) or Suezmax (1 million barrels) vessels to fill VLCCs offshore in Gulf of Mexico load zones, increasing harbor traffic to and from Corpus Christi docks. Adding to the traffic, partially loaded VLCC and Suezmax vessels aren't allowed to navigate the ship channel at night, and VLCCs aren't permitted to pass any other vessels in the channel. The same restrictions apply to large LNG carriers used to export natural gas from the Cheniere terminal in the outer harbor. Another current restriction is a first-come-first-served rule,

which means that vessels use the channel in the order they arrive, regardless of operational efficiency. The Aecom study estimated that current restrictions caused over 4,000 vessel delay hours during 2018. Unless channel restrictions are addressed, the delays will increase to 24,000 hours in 2023.

Channel Investment

To that end, the POCC has embarked on an investment with the U.S. Army Corps of Engineers to deepen its main channel to 54 feet and widen it to 500 feet to accommodate fully laden Suezmax tankers and allow more two-way traffic. The project, started in May, is expected to be complete by 2022. The harbor bridge over the inner ship channel entrance has also been replaced by a taller structure so that larger vessels can fit underneath. Fully laden VLCC vessels won't be able to navigate the outer harbor until the privately financed Carlyle deep channel to Harbor Island is completed in 2023 at the earliest.

Delays Ahead

In the meantime, increased vessel traffic in and out of the Corpus Christi harbor to export crude supplies delivered to docks by new pipelines in the next couple of months is likely to result in greater delays. Those delays will restrict the number of larger vessels operating in the harbor, leading to incoming crude backing up at the docks. The extent of this problem will depend on how much crude flows on the new pipelines and how quickly. Given that the current traffic restrictions will continue at least until POCC channel deepening is complete in 2022, the possibility of congestion in Corpus Christi seems high, despite abundant existing and developing terminal throughput capacity. Under the circumstances, the Trafigura and Phillips 66 offshore mooring buoy projects that avoid the harbor congestion look increasingly attractive to producers and shippers. ■■

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